

Srinivasa Rao Rao

M.B.B.S., M.S.(by res.), DPhil(Oxon)

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Current position

May 2016 - Present **Postdoctoral research assistant**, *Nuffield Dept. of Surgical Sciences, University of Oxford.*

Previous employment

Oct 2014 - Aug 2015 **Postdoctoral research assistant**, *Nuffield Dept. of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford.*

Sep 2015 - Apr 2016 **Postdoctoral research assistant**, *Nuffield Dept. of Surgical Sciences, University of Oxford.*

Qualifications

2017 **Associate Fellow**, *The Higher Education Academy, United Kingdom.*

Mar 2015 **DPhil**, *University of Oxford, United Kingdom.*

Sep 2010 **Master of Science (by research)**, *Indian Institute of Technology Madras, Chennai, India.*

Jul 2006 **Bachelor of Medicine, Bachelor of Surgery**, *Jawaharlal Institute of Postgraduate Medical Education and Research, Pondicherry, India.*

Doctoral Thesis (Marie Curie PhD Fellow, PRO-NEST ➡)

Title *Signalling Pathways Regulating Epithelial-Mesenchymal Transition in Prostate Cancer*

Advisors Profs. Claire Edwards and Freddie Hamdy

Description Project explores the role of tissue non-specific alkaline phosphatase (TNAP) in prostate cancer and the role of microRNAs in its regulation. Involves the use of a number of molecular biology techniques in vitro and in vivo.

Awards, fellowships and funding

2018 **Staff Training Fund**, *Nuffield Dept. of Surgical Sciences, University of Oxford, For GATK training workshop, Cambridge, Jul 2018.*
(Based on application)

2017 **Best Poster**, *European Association of Urology, Annual meeting, London, Mar 2017.*
(Based on abstract ranking)

2016 **Travel Award**, *EAU Section of Urological Research, 23rd annual meeting, October 2016 - €500.*
(Based on abstract ranking)

2014 **Best Poster Award**, *Nuffield Dept. of Surgical Sciences, University of Oxford, Departmental Away Day, September 2014 - certificate.*
(Based on abstract ranking)

2014 **Bone Research Society Travel Bursary**, September 2014 - £150.

2014 **ASBMR Young Investigator Travel Award**, *American Society for Bone and Mineral Research, Annual meeting, September 2014 - \$500.*
(Selected based on abstract ranking)

2014 **St. Edmund Hall College grant**, September 2014 - £350.

- 2014 **New Investigator Award**, *Bone Research Society, UK*, Annual meeting, June 2014 - £493 and certificate.
(Selected based on abstract ranking)
- 2010 - 2013 **Marie Curie PhD Fellowship**, *PRO-NEST, FP7 programme*.
- 2012 **International Bone and Mineral Society Travel Grant**, *Cancer-Induced Bone Disease conference, Lyon*, November 2012 - \$400, (Selected based on abstract ranking).
- 2007 **Qualified for Council of Scientific and Industrial Research - Junior Research Fellowship**, *Govt. of India*, (competitive examination).
- 2007 **Qualified for Indian Council of Medical Research - Junior Research Fellowship**, *Govt. of India*, (competitive examination).

Publications

1. **Rao**, S., Alham, N. K., Upton, E., McIntyre, S., Bryant, R. J., Cerundolo, L., Bowes, E., Jones, S., Browne, M., Mills, I., Lamb, A., Tomlinson, I., Wedge, D., Browning, L., Sirinukunwattana, K., Palles, C., Hamdy, F. C., Rittscher, J. & Verrill, C. Detailed Molecular and Immune Marker Profiling of Archival Prostate Cancer Samples Reveals an Inverse Association between TMPRSS2:ERG Fusion Status and Immune Cell Infiltration. *The Journal of molecular diagnostics: JMD* **22**, 652–669 (May 2020)
2. **Rao**, S., Edwards, C. M. & Edwards, J. R. Modeling the Human Bone–Tumor Niche: Reducing and Replacing the Need for Animal Data. *JBMR Plus* **4**, e10356. [➡](#) (2020) (2020)
3. **Rao**, S., Howarth, A., Kratschmer, P., Snaith, A. E., Yapp, C., Ebner, D., Hamdy, F. C. & Edwards, C. M. Transcriptomic and Functional Screens Reveal MicroRNAs That Modulate Prostate Cancer Metastasis. *Frontiers in Oncology* **10**, 292 (2020)
4. Olechnowicz, S. W. Z., Weivoda, M. M., Lwin, S. T., Leung, S. K., Gooding, S., Nador, G., Javaid, M. K., Ramasamy, K., **Rao**, S., Edwards, J. R. & Edwards, C. M. Multiple myeloma increases nerve growth factor and other pain-related markers through interactions with the bone microenvironment. *Scientific Reports* **9**, 14189. [➡](#) (2020) (Oct. 2019)
5. **Rao**, S., Olechnowicz, S. W. Z., Krätschmer, P., Jepson, J. E. C., Edwards, C. M. & Edwards, J. R. Small Animal Video Tracking for Activity and Path Analysis Using a Novel Open-Source Multi-Platform Application (AnimApp). *Scientific Reports* **9**, 12343. [➡](#) (2020) (Aug. 2019)
6. **Rao**, S., Snaith, A. E., Marino, D., Cheng, X., Lwin, S. T., Orriss, I. R., Hamdy, F. C. & Edwards, C. M. Tumour-derived alkaline phosphatase regulates tumour growth, epithelial plasticity and disease-free survival in metastatic prostate cancer. *British Journal of Cancer*. [➡](#) (Dec. 2016)
7. Cazier, J.-B., **Rao**, S., McLean, C. M., Walker, A. L., Wright, B. J., Jaeger, E. E. M., Kartsonaki, C., Marsden, L., Yau, C., Camps, C., Kaisaki, P., The Oxford-Illumina WGS500 Consortium, Taylor, J., Catto, J. W., Tomlinson, I. P. M., Kiltie, A. E. & Hamdy, F. C. Whole-genome sequencing of bladder cancers reveals somatic CDKN1A mutations and clinicopathological associations with mutation burden. *Nature Communications* **5**. [➡](#) (Apr. 2014)
8. Subramanian, M., **Rao**, S., Thacker, P., Chatterjee, S. & Karunakaran, D. MiR-29b downregulates canonical Wnt signaling by targeting BCL9L and other coactivators of β -catenin in human colorectal cancer cells. *Journal of Cellular Biochemistry*. [➡](#) (July 2014)

Book chapter

1. Karunakaran, D., Subramanian, M. & **Rao**, R. Regulation of MicroRNAs by Natural Compounds: Implications for Cancer Therapy. *Natural compounds as inducers of cell death* (eds Diederich, M. & Noworyta, K.) 401–428 (Springer Netherlands, Jan. 2012). [➡](#)

Professional skills

My research experience spans prostate cancer, bone and microRNA biology, with emphasis on next generation sequencing analysis, dissecting novel cell signalling pathways and mechanisms (eg. EMT) responsible for the metastasis of prostate cancer cells to the bone microenvironment.

Bioinformatics and software	DNA targeted and exome/RNA/microRNA next generation sequencing analysis (alignment, CNV and SNV, differential expression analysis using samtools, bowtie2, bwa, GATK, STAR, among others); programming in R, Python and the Linux command-line; workflow management software such as Snakemake and Cromwell; working on HPC systems with SLURM and SGE; LaTeX
Molecular & cellular Biology	RNA (TRIzol method), DNA and protein isolation; RNA-seq and custom targeted/exome DNA NGS library prep for Illumina, Taqman and SYBR Green real-time PCR, microRNA qRT-PCR; molecular cloning, stable constitutive and inducible gene expression, lentiviral transduction; proliferation, apoptosis and viability assays; transwell migration and matrigel invasion assays; western blotting, ELISA, gelatin zymography; flow cytometry (cell cycle analysis with PI/DAPI), Sanger sequencing and mutation analysis, gene knockout using CRISPR
Cell culture	Culture of cancer and non-cancer (prostate, breast, osteoblast and bone marrow stromal) cell lines; Brightfield, phase contrast, fluorescence microscopy; osteoblast differentiation.
Animal studies	Handling and care of nude mice, dissection and isolation of mouse tissues and cells, tail bleeding, general anaesthesia, intra-cardiac (ultrasound-guided) and intra-tibial tumour inoculation, in vivo GFP and bioluminescence imaging, μ -CT

Teaching experience

- Nov 2019 **Introduction to R for biologists -University of Bath**, *1 of 4 instructors*, Providing expertise in R programming.
Training to DPhil and Masters students in the MSD
- Nov 2019 **R cytometry course - Medical Sciences Division, University of Oxford**, *1 of 5 instructors*, Providing expertise in R programming.
Training to DPhil and Masters students in the MSD
- Nov 2018, **Scientific Misconduct (and how to avoid it) workshop - Medical Sciences Division, University of Oxford**, *1 of 4 instructors*.
Nov 2019
Training to DPhil and Masters students in the MSD
- 2012 - **Supervisor for undergraduate (FHS and Biochemistry) students**, *Botnar present Research Centre, University of Oxford, UK.*
Day-to-day guidance and supervision of 4 undergraduate students in their lab projects. This involved help in planning experiments and analysing research data, with emphasis on the students learning to design and interpret scientific experiments on their own. Support and advice with writing and presentation of project reports. Submitting performance reports on OxCORT.
2012 - FHS project (8 weeks)
2013 - FHS project (8 weeks)
2014 - 2015 - Biochemistry project (18 weeks)
2015 - FHS project (8 weeks)
2016 - 2017 - Biochemistry project (18 weeks)
2017 - 2018 - Biochemistry project (18 weeks)
2017 - MSc (Immunology) project (18 weeks)
2018 - MSc (Immunology) project (18 weeks)
2018 - FHS project (4 weeks) x 2
2020 - Biochemistry project (23 weeks)

- 2014, 2015, 2018 **Termly student seminars, NDORMS, University of Oxford, Session chair/assessor.**
Feedback to DPhil students on their presentations
- Oct 2013 - **Undergraduate tutor, University of Oxford, UK.**
- Dec 2015 Tutorial teaching on the topic "MicroRNA biogenesis and function" Tutorials involved discussion of basic and intermediate concepts. Students were also required to read recommended literature (at least 2 reviews and 2 research articles) in the field of microRNAs, and answer an essay question set by me. The essay was assessed and discussed with the student one-on-one in the tutorial. In addition, students were provided with an additional research paper for critical analysis. Submitting performance reports on OxCORT.
MT 2013 - 3 tutorials (6 students)
HT 2014 - 2 tutorials (3 students)
MT 2014 - 2 tutorials (3 students)
MT 2015 - 3 tutorials (6 students)
- Jan 2014 **"MicroRNAs and cancer", Doctoral Teaching Programme, Nuffield Dept. of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford, UK.**
Departmental lecture for first year DPhil students, covering basic and intermediate concepts in microRNA biology and their functions in cancer.
- Jan 2008 - **Half-time teaching and research assistantship (HTRA) for "Cancer Biology" and "Microbiology" undergraduate (BTech) courses, Indian Institute of Technology Madras (IITM), India.**
Stipendiary position involving assistance to the professor in preparation of course material, laboratory demonstration, exam invigilation, grading of test papers.

Professional membership

- 2016 - **European Association of Cancer Research (EACR).**
present
- 2016 - **British Association of Cancer Research (BACR).**
present

Outreach and extracurricular activities

- Jun 2020 **Handling data frames the data.table way, R Code Clinic, Big Data Institute, Oxford.**
Code workshop on the data.table R package
- Jan 2019 **Regex in R, R Users Group Oxford.**
Walkthrough of regular expressions usage in R at an informal gathering of R users in Oxford
- Oct 2015 **DEAD Friday event, Ashmolean Museum, University of Oxford.**
Demonstration of bone structure and function to lay public
- May 2015 **Molecular Mechanisms in bone-metastatic prostate cancer, Phenotype (Oxford University Biochemical Society termly magazine), Trinity term 2015** ➡.
Invited article explaining my research work to a general audience
- May 2015 **Review of Vertebrate Palaeontology, Phenotype (Oxford University Biochemical Society termly magazine), Trinity term 2015** ➡.
Book review
- Mar 2015 **Oxfordshire Science Festival, Museum of Natural History, University of Oxford.**
Demonstration of bone structure and function to lay public
- Feb 2015 **Research Expo Day, St. Edmund Hall, University of Oxford.**
Demonstration and explanation of prostate cancer research to lay public

Languages

English Fluent

TOEFL Test of English as a Foreign Language, 2009

Telugu Native

Hindi Basic

Tamil Basic

Qualities

Personal skills: Strong problem-solving skills, initiative in establishing new methods, collaborations within and outside the department/institute, good oral and written communication skills.

International Experience: Attended and presented research at a number of conferences worldwide. Lived in Oxford, UK for 10 years.